

Appendix A

Aquatic Invasive Species That Threaten Utah

Aquatic invasive species (AIS) are not strangers to Utah. In fact, many AIS now inhabit Utah and others threaten the state with immediate arrival. The list frequently grows with discoveries of new AIS, presenting new threats and challenges for natural resource managers. Several new and potential AIS are being further assessed--the amphibian bacterium redleg *Aeromonas hydrophila*, with a potential statewide distribution; the Chinese mysterysnail *Cipangopaludina chinensis* in central Utah; the Pacific treefrog *Pseudacris regilla* and their relatives possibly in northern (Raft River Mountains) Utah and recently re-introduced into southern Utah (Washington County); the spiny softshell *Apalone spinifera* in the Virgin River of southern Utah, all pond sliders *Trachemys spp.* and cooters *Pseudemys spp.* with potential statewide distributions, and the snapping turtle *Chelydra serpentina* in northern and central Utah. Other species being assessed as AIS, and also not included in this plan are the flathead catfish *Pylodictis olivaris*, currently found in Arizona; the jaguar quapote *Cichlasoma managuense*, which is an aquarium discard; rainwater killifish *Lucania parva*, which arrived via game fish transplants from the mid west; goldfish *Carassius auratus*, which are a widespread aquarium discard; common carp *Cyprinus carpio*, which was introduced as a food source in the late 1800s into Utah County by the agency now known as the U.S. Fish and Wildlife Service; red shiner *Cyprinella lutrensis*, which was initially stocked as a game fish forage crop by Utah Division of Wildlife Resources, but now severely limits recovery of endemic fish in the Virgin River; golden shiner *Notemigonus crysoleucas*, which was also initially stocked as a game fish forage crop by Utah Division of Wildlife Resources; and fathead minnow *Pimephales promelas*, which was stocked into Utah Lake by Utah Division of Wildlife Resources as a game fish forage crop. None of the above are presented as a species profile in the biographic accounts for this plan; they represent AIS determinations that will occur as the plan is re-assessed during its first five years (2009-2013).

Aquatic pathogens (e.g. viral hemorrhagic septicemia, cold water disease, whirling disease, Asian tapeworm *Bothriocephalus acheilognathi*, and the trematode *Centrocestus formosanus*, etc.) are also considered as AIS, but are not included in the individual AIS species accounts contained within this plan. Aquatic pathogen control is managed by the Utah Department of Agriculture and Food.

AIS are exotic species to Utah and aggressively compete with our native flora and fauna. They frequently have longer evolutionary histories than native biota, which makes AIS more effective competitors that are capable of securing vacant niches. AIS typically have few if any natural predators. And, AIS result in economic impacts to the State of Utah.

The AIS list for this plan currently includes fungi (1 species), algae (1 species), plants (5 species), mollusks (6 species), crustaceans (4 species), fish (3 species), amphibians (4 species) and reptiles (1 species). Biographic accounts for individual AIS follow; they are

ordered in a phylogenetic progression with species arranged alphabetically by their most accepted common name. The accounts are not intended to be complete documentations of what science knows about each species. Rather, they will serve as a quick ready reference for day-to-day management discussions amongst Utah's AIS staff and others. The Internet, professional periodical publications, "white and grey" agency papers, and journals for various societies remain the core for more detailed, in-depth literature research. Each account includes discussion about the species ecology; distribution in Utah, including a map; pathways of introduction; management considerations; and citations to the literature used to develop the account.

The aforementioned list for potential AIS and the following biographic accounts for known AIS were compiled by Utah Division of Wildlife Resources' Aquatic Invasive Species Personnel and others as follows:

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Author's Note: Jenny served as the Northern Region's Aquatic Invasive Species Biologist during the plan's initial preparation; after which she performed as a private consultant during final editing.

AIS addressed in this plan that are currently considered to threaten Utah follow: